AMENDMENTS TO THE CLAIMS

1. (currently amended) An apparatus for controlling a flow control device in a wellbore, comprising:

(a) a non-mechanical fluid level sensor being positioned at a first depth in the wellbore, said non-mechanical fluid level sensor measuring a parameter of interest relating to the fluid surrounding said non-mechanical fluid level sensor; and

(b) a controller operatively coupled to said non-mechanical fluid level sensor and to the flow control device, <u>said controller determining whether said fluid level sensor is surrounded by a liquid or a gas based on a differential in the measured parameter of interest,</u> said controller controlling the flow control device in response to the measurements provided by said non-mechanical fluid level sensor.

2. (Previously presented) The apparatus according to claim 1 wherein said non-mechanical fluid level sensor measures temperature, and said controller calculates a temperature differential, said temperature differential being indicative of whether said non-mechanical fluid level sensor is surrounded by a liquid or a gas.

3. (Previously presented) The apparatus according to claim 1 further comprising a power source coupled to said non-mechanical fluid level sensor for applying an electrical signal to said non-mechanical fluid level sensor, said non-mechanical fluid level sensor heating the surrounding fluid upon receiving the electrical signal.

4. (Previously presented) The apparatus according to claim 3 wherein said power source cyclically heats said non-mechanical fluid level sensor.

5. (Previously presented) The apparatus according to claim 1 further comprising a heating element adjacent said non-mechanical fluid level sensor for heating the surrounding fluid, and wherein said non-mechanical fluid level sensor measures the temperature of the surrounding fluid.

6. (Previously presented) The apparatus according to claim 1 wherein the flow control device is a pump and wherein said controller controls the pump by one of: (i) energizing the pump; (ii) de-energizing the pump; (iii) energizing the pump after a pre-set time delay; (iv) de-energizing the pump after a pre-set time delay; (v) adjusting the flow rate of the pump.

7. (Previously presented) The apparatus according to claim 1 further comprising a second sensor for measuring a parameter of interest relating to one of: (i) hydrocarbon production; (ii) water production; and (iii) wellbore conditions; and wherein said controller controls the pump in response to the measurements of said non-mechanical fluid level sensor and said second sensor.

8. (Previously presented) The apparatus according to claim 1 comprising a second non-mechanical fluid level sensor being positioned at a second depth in the wellbore, said second non-mechanical fluid level sensor measuring a parameter of interest relating to the fluid surrounding said non-mechanical fluid level sensor; and wherein said controller is further configured to interrogate said non-mechanical fluid level sensor and said second non-mechanical fluid level sensor to determine the location of a gas-water interface in the wellbore.

9. (currently amended) A system for controlling a downhole pump used to adjust the height of a water column in a wellbore, comprising:

(a) a plurality of level sensors positioned along wellbore, said level sensors being adapted to measure the temperature of a surround wellbore fluid;

(b) a power source adapted to selectively transmit an electrical signal to said level sensors; and

(c) a control unit operably coupled to said level sensors and said power source, said control unit determining whether said level sensor is surrounded by a liquid or a gas based on a temperature differential, said control unit controlling the

pump in response the temperature measurements provided by at least one of said level sensors.

10. (Previously presented) The system according to claim 9 wherein said power source is configured to cyclically heat said level sensors.

11. (Previously presented) The system according to claim 9 wherein said controller is programmed with a first and second switch point for adjusting operation of the pump, said controller determining whether either of said first or second switch points have been reached by processing the temperature measurements of at least one of said level sensors.

12. (Previously presented) The system according to claim 11 wherein said controller uses at least said sensor measurements to determine the height of the water column by one of: (i) extrapolation, and (ii) interpolation.

13. (Previously presented) The system according to claim 12 wherein said controller further utilizes the rate of change of the height of the water column to determine the height of the water column.

14. (withdrawn) A system for determining a location of an interface between a first fluid and second fluid, the system comprising:

(a) a sensor positioned in one of the first fluid and the second fluid, the sensor being configured to heat the surrounding fluid and measure the temperature of the surrounding fluid; and

(b) a processor receiving temperature measurements from said sensor, said processor processing temperature data from said sensor to determine whether said sensor is in the first fluid or the second fluid.

15. (currently amended) A method for controlling a flow control device in a wellbore, comprising:

(a) positioning a non-mechanical fluid level sensor in the wellbore;

(b) measuring a parameter to a fluid surrounding the non-mechanical fluid level sensor using the non-mechanical fluid level sensor;

(c) determining whether the non-mechanical fluid level sensor is surrounded by a liquid or a gas based on a differential in the measured parameter of interest; and

~~(c)~~ (d) controlling the flow control device in response to the measurements provided by the non-mechanical fluid level sensor.

16. (Previously presented) The method according to claim 15 wherein the measured parameter is temperature.

17. (Previously presented) The method according to claim 16 ~~15~~ further comprising:

(a) processing the temperature measurements ~~data~~, the processing including one of: (i) calculating a temperature differential; (ii) calculating a frequency; and (iii) calculating a rate of change of temperature; and

(b) determining whether the non-mechanical fluid level sensor is surrounded by a liquid or a gas using the processed temperature data.

18. (Previously presented) The method according to claim 15 further comprising heating the fluid surrounding the non-mechanical fluid level sensor.

19. (Previously presented) The method according to claim 18 wherein the fluid surrounding the non-mechanical fluid level sensor is cyclically heated.

20. (Previously presented) The method according to claim 15 wherein the flow

control device is a pump and wherein controlling the pump include an action selected from a group consisting of: (i) energizing the pump; (ii) de-energizing the pump; (iii) energizing the pump after a pre-set time delay; (iv) de-energizing the pump after a pre-set time delay; (v) adjusting the flow rate of the pump.

21. (Previously presented) The method according to claim 15 measuring a second parameter of interest with a second sensor, the second parameter of interest being selected from one of: (i) hydrocarbon production; (ii) water production; and (iii) wellbore conditions; and wherein the flow control device is controlled in response to the measurements of the non-mechanical fluid level sensor and the second sensor.

22. (Previously presented) The method according to claim 15 comprising:

(a) positioning a second non-mechanical fluid level sensor in the wellbore, the second non-mechanical fluid level sensor measuring a parameter of interest relating to the fluid surrounding the non-mechanical fluid level sensor; and

(b) determining the location of a gas-water interface in the wellbore using the measurements of one of (i) the non-mechanical fluid level sensor; and (ii) the second non-mechanical fluid level sensor.

23. (Previously presented) The method according to claim 15 wherein the measured parameter of interest is selected from one of (i) a thermal property, (ii) an electrical property, (iii) a magnetic property, and (iv) a fluid property.

24. (Original) A method for optimizing hydrocarbon production by adjusting a height of a water column in a wellbore, comprising:

(a) positioning a pump in fluid communication with the water column;

(b) positioning a plurality of level sensors along the wellbore, the level sensors being adapted to measure the temperature of a surrounding wellbore fluid

<u>(c) determining whether the non-mechanical fluid level sensor is surrounded by a liquid or a gas based on a temperature differential;</u> and

~~(c)~~ <u>(d)</u>

(c) controlling the pump in response to the temperature measurements provided by at least one of the level sensors.

25. (Previously presented) The method according to claim 24 further comprising cyclically heating the surrounding wellbore fluid.

26. (Previously presented The method according to claim 24 further comprising:

(a) selecting a first and second switch point for adjusting operation of the pump;

(b) determining whether either of the first or second switch points have been reached by processing the temperature measurements of at least one of the level sensors.

27. (Previously presented) The method according to claim 24 further comprising determining the height of the water column by one of: (i) extrapolation, and (ii) interpolation.

17. (Previously presented) The method according to claim <u>16</u> ~~15~~ further comprising:

(a) processing the temperature <u>measurements</u> ~~data~~, the processing including one of: (i) calculating a temperature differential; (ii) calculating a frequency; and (iii) calculating a rate of change of temperature; and

(b) determining whether the non-mechanical fluid level sensor is surrounded by a liquid or a gas using the processed temperature data.

18. (Previously presented) The method according to claim 15 further comprising heating the fluid surrounding the non-mechanical fluid level sensor.

19. (Previously presented) The method according to claim 18 wherein the fluid

surrounding the non-mechanical fluid level sensor is cyclically heated.